CALIBRATION STANDARD REQUIREMENT

FOR AN

ABSOLUTE PRESSURE SENSOR

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PROCUREMENT PACKAGE

Prepared by: Naval Warfare Assessment Division
Measurement Science Directorate
Code MS-33
Corona, CA 91718-5000

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1. SCOPE

1.1 Scope. This requirement defines the mechanical, electrical, and electronic characteristics for an Absolute Pressure Sensor. This equipment is intended to be used by Navy personnel in shorebased and primary laboratories to calibrate or measure vacuum measurements. For the purposes of this requirement, the Absolute Pressure Sensor shall be referred to as the APS.

2. APPLICABLE DOCUMENTS

2.1 Controlling Specifications. MIL-T-28800, “Military Specification, Test Equipment for use with Electrical and Electronic Equipment, General Specification for,” and all documents referenced therein of the issues in effect on the date of this solicitation shall form a part of this requirement.

3. REQUIREMENTS

3.1 General. The APS shall conform to the Type II, Class 5, Style E requirements as specified in MIL-T-28800 for Navy shipboard and shorebased use as modified below. The use of material restricted for Navy use shall be governed by MIL-T-28800.

3.1.1 Design and Construction. The APS design and construction shall meet the requirements of MIL-T-28800 for Type II equipment.

3.1.2 Power Requirement. The APS shall operate from a source of 0 to ± 10 VDC less than 10K ohm load.

3.1.2.1 Fuses or Circuit Breakers. Fuses or circuit breakers shall be provided. If circuit breakers are used, both sides of the power source shall be automatically disconnected from the equipment in the event of excessive current. If fuses are used, only the line side of the input power line, as defined by MIL-C-28777, shall be fused. Fuses or circuit breakers shall be readily accessible.

3.1.2.2 Power Connection. The APS shall have an interface cable for capability of remote sensing.

3.1.3 Dimensions and Weight. Maximum dimensions shall not exceed 8 inches in width, 5 inches in height, and 5 inches in depth. The APS weight shall not exceed 15 pounds.

3.1.4 Lithium Batteries. Per MIL-T-28800, lithium batteries are prohibited without prior authorization. A request for approval for the use of lithium batteries, including those encapsulated in

integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals. Approval shall apply only to the specific model proposed.

3.2 Environmental Requirements. The APS shall meet the environmental requirements for a Type II, Class 5, Style E equipment with the deviations specified below.

3.2.1 Temperature and Humidity. The APS shall meet the conditions below:

	Temperature (°C)	Relative Humidity (%)
Operating	10 to 30	95
	30 to 40	75
Non-operating	-40 to 70	Not Controlled

3.2.2 Electromagnetic Compatibility. The electromagnetic compatibility requirements of MIL-T-28800 are limited to the following areas: CE01, CE03, CS01, CS02, CS06, RE01, RE02 (14 kHz to 1 Ghz), and RS03.

3.3 Reliability. Type II reliability requirements are as specified in MIL-T-28800.

3.3.1 Calibration Interval. The APS shall have an 85% or greater probability of remaining within tolerances of all specifications at the end of a 12 month period.

3.4 Maintainability. The APS shall meet the Type II maintainability requirements as specified in MIL-T-28800 except the lowest discrete component shall be defined as a replaceable assembly. Certification time shall not exceed 60 minutes.

3.5 Performance Requirements. The APS shall provide the following capability as specified below. Unless otherwise indicated, all specifications shall be met following a 30-minute warm-up period.

3.5.1 Pressure Range. The APS shall have a minimum full scale pressure range up to 100 mmHg.

3.5.2 Resolution. The APS shall have a minimum resolution of $1x10^{-6}$ full scale.

3.5.3 Accuracy. The APS shall have a minimum accuracy of 0.05% of reading ± the temperature coefficient.

3.5.4 Useable Measurement Range. The APS shall have a useable measurement range of at least $1x10^{-5}$ of full scale.

3.5.5 Zero Temperature Coefficient. The APS shall have a maximum zero temperature coefficient of 4 ppm full scale per °C.

3.5.6 Span Temperature Coefficient. The APS shall have a maximum span temperature coefficient of 20 ppm (R/°C).

3.5.7 Volume. The APS shall have a nominal volume of 2.5 cc ± 1.0 cc.

3.5.8 Pressure. The APS shall be able to withstand an over-pressure of at least 45 psia.

3.5.9 Time Response. The APS shall have a time response of less than 25 msec.

3.6 Operating Requirements. The APS shall provide the following capabilities.

3.6.1 Materials. The APSs material exposed to gases shall be stainless steel.

3.6.2 Pressure Fittings. The APS shall have pressure fittings of Cajon 4-VCR; male or female as specified.

3.6.3 Vibration Isolation. The APS shall have vibration isolation.

3.6.4 Internal Environmental Control. The APS shall require an internal environmental control above ambient temperature with thermal transpiration effecting reading of less than 4%.

3.7 Accessories. The following accessories shall be included with the APS.

3.7.1 Cable. The APS shall include a cable to attach it to the MKS model number 270 readout device. The cable shall have a minimum length of 4 feet.

3.8 Manual. At least two copies of an operation and maintenance manual shall be provided. The manual shall meet the requirements of MIL-M-7298.

3.8.1 Calibration Procedure. A calibration procedure in accordance with MIL-M-38793 shall be provided.

3.9 Compatibility. The APS shall be compatible with the Ruska 2411 AutoPrompt Converter and the MKS 270 readout.